920522-95589

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE THE APPLICATION OF:	)	
	)	**Examiner: Andrew T. Sever**
Brecht Halsberghe et al	)	
	)	**Art Unit 2851**
SERIAL NO. 10/785,249	)	
	)	**Confirmation No. 8919**
FILED: February 24, 2004	)	
	)	
FOR: Optical Arrangement For Non-Inverting Illumination System	)	

RESPONSE TO OFFICE ACTION DATED MARCH 10, 2006

Honorable Director of Patents and Trademarks

P.O. Box 1450

Alexandria, VA 22313-1450

Dear Sir:

In response to the Office Action dated March 10, 2006, it is requested that the application be amended as follows:

IN THE CLAIMS:

1. (currently amended) A color projection system for projecting an image on a screen, comprising at least one light source for emitting a white light beam, a light splitting means for splitting said white light beam into color subbeams each comprising light of a different wavelength or wavelength range, for each of said color subbeams a light modulating means, and a dichroic prism for recombining said color subbeams, each of said modulating means positioned adjacent to a side of said dichroic prism, wherein said color projection system furthermore comprises further optical components for imaging each of said color subbeams onto the relevant light modulating means such that the images of each of said color subbeams on the corresponding light modulating means have a substantially equal size and such that the images of each of said color subbeams on the screen have the same orientation and such that for an image representing a plane of equal color, the distance between the average color coordinates in the 1976 CIE Chromaticity Diagram for the ANSI-points at the left side of the image on the screen and for the ANSI-points at the right side of the image on the screen is smaller than 0.01.

2. (original) A color projection system according to claim 1, wherein images of each of said color subbeams have a substantial equal size comprises that differences between the size of said images of each of said color beams on the corresponding light modulating means are smaller than 5%, preferably smaller than 1%, more preferably smaller than 0.5%.

3. (previously presented) A color projection system according to claim 1, said color projection system adjusted such that the light path from the at least one light source to behind the dichroic prism is situated in one plane.

4. (cancelled)

5. (withdrawn) A color projection system according to claim 1, said further optical components comprising a first imaging lens (54), whereby for each color subbeam the light path length between the first imaging lens (54) and the light modulating means (56) is equal within 1%, preferably equal within 0.1%, more preferably equal within 0.01%.

6. (withdrawn) A color projection system according to claim 1, said further optical components comprising a first imaging lens (54) and said light splitting means comprising at least a first light splitting device (102) for splitting the white beam in a first color beam comprising light of a first wavelength or wavelength region and a further color beam, whereby said first light splitting device (102) is positioned in the pupil of the first imaging lens.

7. (withdrawn) A color projection system according to claim 6, wherein said first light splitting device (102) is a dichroic mirror.

8. (withdrawn) A color projection system according to claim 7, wherein said dichroic mirror has a small incidence angle dependency.

9. (withdrawn) A color projection system according to claim 8, said dichroic mirror transmitting a first part of the light beam and reflecting a second part of the light beam and having a 50% transmission point whereby 50% of the light beam is transmitted, wherein said small incidence angle dependency is such that the difference for the wavelength at which the 50% transmission point of the dichroic mirror is positioned for different angles of incidence, is smaller than 25 nm, preferably smaller than 17 nm, more preferably smaller than 7 nm.

10. (original) A color projection system according to claim 1, wherein said further optical components furthermore comprise color filters.

11. (previously presented) A color projection system according to claim 1, wherein said optical components comprise a further number of imaging lenses positioned in the light paths of the different color subbeams downstream the first imaging lens, wherein either for each color subbeam, the number of imaging lenses is even or for each color subbeam the number of imaging lenses is odd.

12. (original) A color projection system according to claim 1, wherein said optical components comprise a number of mirrors positioned in the light paths of the different color subbeams, wherein either for each color subbeam, the number of mirrors is even or for each color subbeam the number of mirrors is odd.

13. (previously presented) A color projection system according to claim 1, wherein said light modulating means are transmissive light modulating means and wherein said color projection system comprises no mirror between said transmissive light modulating means and said dichroic prism .

14. (currently amended) A method for projecting a color image, comprising the steps of ,

- driving one or more light sources to create a white light beam,
- splitting said white light beam in color subbeams, each comprising light of a different wavelength or wavelength region,
- imaging each of said color subbeams on a light modulating means, positioned adjacent to a side of a dichroic prism,
- modulating each of said color subbeams by said light modulating means and recombining said modulated color subbeams in said dichroic prism,
- projecting said recombined light beam characterized by said imaging each of said color subbeams on a light modulating means is performed such that the image on the light modulating means has equal size for each of said color subbeams and such that the image on the screen has equal orientation for each of said color subbeams and such that in an image representing a plane of equal color, the distance between the average color coordinates in the 1976 CIE Chromaticity Diagram for the ANSI-points at the left side of the image on the screen and for the ANSI-points at the right side of the image on the screen is smaller than 0.01.

15. (withdrawn) A method for projecting according to claim 14, said imaging is performed such that the light paths between a first imaging lens (54), being the imaging lens closest in the light path to the at least one light source (52) and the light modulating means (56) for each of the color subbeams are equal in length within 1%, preferably equal within 0.1%, more preferably equal within 0.01%.

16. (previously presented) A color projection system according to claim 1, said further optical components comprising first imaging lenses, whereby for each color subbeam the light path length between the first imaging lenses and the light modulating means is equal within 1 %.

17. (previously presented) A color projection system according to claim 1, said further optical components comprising first imaging lenses and said light splitting means comprising at least a first light splitting device for splitting the white beam in a first color beam comprising light of a first wavelength or wavelength region and a further color beam, whereby said first light splitting device is positioned at the pupil of the first imaging lenses.

18. (previously presented) A color projection system according to claim 17, wherein said first light splitting device is a dichroic mirror.

19. (previously presented) A color projection system according to claim 18, wherein said dichroic mirror has a small incidence angle dependency.

20. (previously presented) A color projection system according to claim 19, wherein said dichroic mirror transmitting a first part of the light beam and reflecting a second part of the light beam and having a 50 % transmission point whereby 50 % of the light beam is transmitted, wherein said small incidence angle dependency is such that the difference for the wavelength at which the 50 % transmission point of the dichroic mirror is positioned for different angles of incidence is smaller than 25 nm.

21. (previously presented) A method for projecting according to claim 14, said imaging is performed such that the light paths between first imaging lenses, being the imaging lenses closest in the light paths to the at least one light source and the light modulating means for each of the color subbeams are equal in length within 1 %.

22. (new) A color projection system according to claim 1 wherein the distance is smaller than 0.007.

23. (new) A method according to claim 14 wherein the distance is smaller than 0.005.

24. (new) A method according to claim 14 wherein the distance is smaller than 0.007.

IN THE ABSTRACT:

Cancel the Abstract as filed with the Application and substitute that appended hereto.

REMARKS

1. The Examiner's reconsideration of the application is urged in view of the amendments above, the following corrections and the attachments hereto and the comments which follow.

2. Regarding formalities, the objection to the specification has been rectified by the substitute Abstract attached hereto.

Concerning the drawings, reconsideration of the requirement is requested, since it is submitted that there is adequate support in the specification. In the specification, it is explained that color filters can be introduced by replacing the mirrors with dichroic mirrors. Thus, in relation to Figure 4, this would mean identifying the mirrors 108 and 118 as both mirrors and dichroic mirrors. As the mirrors 108 and 118 are already illustrated, and there would be no change in the drawings at all, reconsideration is requested. If some amendment of the specification would be preferred by the Examiner, certainly that could be done but it is believed that there is already adequate description in the specification.

3. In the Office action, page 5, point 9, the Examiner rejected the claims 1- 3, 10-14, 16-18, and 21 under 35 U.S.C. 103 (a) as being unpatentable over Nishida (US 6,871,963).

Amended independent claim 1 is set forth above which is a combination of claims 1 and 4, as suggested by the Examiner on page 9, points 10 and 11 of the Office Action. New claims 22 to 24 have been added to avoid the "or" statements in original claim 4.

Amended claim 1 describes a color projection system for projecting an image on a screen comprising the following features:

a. one light source for emitting a white light beam,

b. a light splitting means for splitting said white light beam into color subbeams each comprising light of a different wavelength or wavelength range,

c. for each of said color subbeams a light modulating means,

d. and a dichroic prism for recombining said color subbeams,

e. each of said modulating means positioned adjacent to a side of said dichroic prism,

f. wherein said color projection system comprises further optical components for imaging each of said color subbeams onto the relevant light modulating means

g. such that the images of each of said color subbeams on the corresponding light modulating means have a substantially equal size and

h. such that the images of each of said color subbeams on the screen have the same orientation and

i. wherein for an image representing a plane of equal color, the distance between the average color coordinates in the 1976 CIE Chromaticity Diagram for the ANSI-points at the left side of the image on the screen and for the ANSI-points at the right side of the image on the screen is smaller than 0.01.

In Nishida a color projection system for projecting an image on a screen is disclosed comprising a light source, emitting an illumination light, a color light separation optical system for separating the illumination light into three color light beams, for each of the color light beams, a light valve for modulating each of the color light beams and a cross dichroic prism for synthesizing the color beams exiting from the light valves.

However, Nishida does not disclose a color projection having a feature related to the distance between the average color coordinates in the 1976 CIE Chromaticity Diagram of the ANSI-points at the left side and the ANSI-points at the right sight of an equal color image.

Therefore, amended claim 1 is not anticipated by Nishida.

A color projection system for projecting an image on a screen as described in amended claim 1 is not disclosed either in US 6,807,020 (Wolfe) or in US 6,344,927 (Itoh e.a.).

Amended claim 1 is thus not anticipated by the prior art cited in the Office Action.
The same reasoning can be applied to amended independent claim 14.

All other claims being dependent on claim 1 or claim 14, they incorporate all subject matter of these claims and add additional subject matter which makes them *a fortiori* not anticipated by each of the cited references.

4. Amended claim 1 would not have been obvious over Nishida in view of Wolfe or in view of Itoh.

In the Wolfe Patent, lens arrays are described correcting color or hue of a projected image as a function of the angle to the viewing screen at which the viewer sees the projected image. Such arrays are interposed between projection CRT's and a display screen. There is no indication in the Wolfe Patent of feature i., mentioned above. In this context Wolfe is only referring to the 1976 CIE Standard and is calculating the value of the color coordinates as a function of the viewing angle. In the present invention, use is made of the distance between the color coordinates in the u'v' color diagram of an average value of the ANSI points at the left side of an equal color image and an average value of the ANSI points at the right side of that image.

In the Itoh Patent, the 1976 CIE Standard or an application of this Standard is not mentioned.

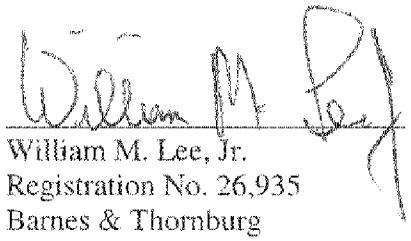
Amended claim 1 is thus also non-obvious in view of the prior art.

The same reasoning can also be applied to independent claim 14. All other claims are dependent on independent claim 1 or independent claim 14 and their subject matter is thus also non-obvious.

Consequently, the subject matters of all new claims are not only novel but also non-obvious.

Given the above, it is submitted that the application is now in condition for allowance, and the Examiner's further and favorable reconsideration in that regard is urged.

Respectfully submitted,



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ABSTRACT

OPTICAL ARRANGEMENT FOR NON-INVERTING ILLUMINATION SYSTEM

An optical design is described to be used in a color projection system. The system comprises a white light source (52), a light splitting means to split the white beam into color subbeams, optical components to direct each color subbeam on a light modulating means (56) and a dichroic prism (70). The light splitting means and the optical components are arranged such that each of the images of the color subbeams imaged on the light modulating means (56) has equal size and orientation, i.e. such that the magnification of the color subimage on the light modulating means (56) is equal. This is obtained by providing equal light paths for each color subbeam or by providing optical components such that either all different color images on the screen are inverted or none of the different color images are inverted.